assembly, said toothed ring having a plurality of teeth extending generally parallel to said axis of rotation and spaced apart from each other, said toothed ring and said rotor and stator assembly defining a gas ring therebetween; and

a reactant gas supply fluidly coupled with said gas ring.

A6

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19. (Amended) The fiber loading apparatus of claim 18, including a control valve coupled with said reactant gas supply for controlling at least one of a pressure and flow rate of reactant gas into said gas ring.

A7

REMARKS

Claims 1-21 were pending and considered by the Examiner. Claims 1-21 were rejected. In response, claims 1, 9, 12 and 19 have been amended. Claims 1-21 remain pending. Reconsideration and allowance are respectfully requested.

The specification has been amended, and a Request for an Approval of Drawing Changes has been submitted concurrently herewith, taking into consideration the comments made by the Examiner in identifying certain informalities in the application.

Page 5 of the specification has been amended to properly identify the distribution cross with the number 14, and to identify the disc that couples rotor 40 to input shaft 42 with the number 49. On page 7 of the specification, the teeth referred to in line 20 are now identified with the numeral 46, which was shown in the drawings but not mentioned in the specification. The Request for Approval of Drawing Changes includes only the addition of number 49 and a lead line therefrom and to the disc. Entry of the amendments to the specification and approval of the proposed drawing correction are respectfully requested. It is believed that these changes to the

specification and drawings overcome the informality identified by the Examiner, and the informality issues should be removed.

Claims 9 and 12-21 have been rejected under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards the invention.

In response thereto, claims 9, 12 and 19 have been amended, taking the Examiner's comments into consideration. Specifically, claim 9 has been amended to recite "a reactant gas", consistent with the recitations in preceding claims. Claim 12 has been amended to recite a "plurality of radially extending paddles" which is consistent with recitations in subsequent claims. Claim 19 has been amended to recite a "reactant gas" consistent with the recitations in preceding claims.

It is respectfully submitted that the amendments made to claims 9, 12 and 19 resolve any indefiniteness or clarity issues. It is respectfully requested that the rejection under 35 U.S.C. section 112 (b) removed.

Claims 1-10 have been rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative under 35 U.S.C. 103(a) as being obvious from U.S. Patent 6,073,865 (Kriebel et al.). In response thereto, claim 1 has been amended. Accordingly, applicant submits that claim 1, and claims 2-10 depending therefrom are now in condition for allowance, which is hereby respectfully requested.

Kriebel et al. teaches a process and an apparatus for carrying out the process for efficiently disintegrating and raising the temperature of a friable material. The embodiment shown in Fig. 8 is used to treat a plug 1 from a thickening press 2. The apparatus includes a stator 15 and rotor 16, with a first pulverizing element 17 mounted in the center of rotor 16. Pulverizing element 17

is, for example, a wing-shaped or cross-shaped pulverizing element to rasp off and distribute small pieces of the material. Primary stator teeth 22 are provided to retard the material and increase the material retention time in a vapor chamber 18 between primary stator teeth 22 and a disperser zone 19. A super heated vapor ST is provided to vapor chamber 18 for heating the material.

The process and apparatus of Kriebel, et al. are is used for the treatment of waste paper, to disintegrate and disperse ink particles in recycled waste paper. Particles that can not be removed easily from the fiber are broken into small pieces so that the particles are less noticeable and less easily detected in the paper end product. Steam is used to heat the pulp such that the fibers and ink particles attached hereto are made more flexible. In the dispersion zone, the fibers are rubbed one against another so that any contaminants thereon are dispersed into very little pieces or are rubbed off the fiber. In a treatment process after the dispersion process, the contaminants can be filtered or screened out. To make such a dispersion process work, a gap not greater than about 3 millimeters is needed (claim 23). With such a narrow gap between discs, high energy is needed, thus making the dispersion process a high shear process. Any such high shear process, such as dispersion or refining, changes the fiber characteristics by defibrillation, resulting in mechanical fiber property changes.

In contrast to the teaching of Kriebel et al., claim 1, as amended recites, in part:

> "... a rotor and stator assembly positioned within said housing radially outside of said distribution member, including a rotor and stator in opposed relationship defining a gap therebetween, said gap being between approximately 0.5 mm and 100 mm;"

Applicant submits that such an invention is neither taught, disclosed nor suggested by Kriebel, et al., and the present invention has distinct advantages over the prior art.

Kriebel, et al. teaches a process and a device requiring a high shear. Close gaps between treatment plates are provided to cause mechanical interaction between fibers, thereby detaching and dispersing contaminants such as ink held thereon. Kriebel et al. does not teach an apparatus for loading fibers with calcium carbonate with a rotor and stator assembly including a rotor and stator in opposed relationship defining a gap therebetween of between about 0.5 mm and 100 mm. The present invention teaches a low shear apparatus that does not create fiber to fiber mechanical interaction. Any such close interaction between fibers would change the crystallization process used in fiber filling in a negative way. To achieve optimal crystal growth the pulp fibers must stay fluffed. To retain this physical characteristic of the fibers, a wide gap, low shear apparatus is required, and one skilled in the art would not look to high shear apparatuses of the prior art for use in fiber filling processes.

The present invention includes advantages over the prior art. The apparatus functions to improve productivity in a chemical loading process for fiber suspensions. The apparatus provides fiber loading in a continuous manner by improving output quantities of a loaded fiber suspension. The rotor and stator assembly adequately distributes the calcium carbonate crystals within the fiber suspension. For these reasons, it is respectfully submitted that independent claim 1 recites an invention not taught by Kriebel et al. and that independent claim 1 together with dependent claim 2-10 should be allowed.

Claims 4 and 12-20 have been rejected under 35 U.S.C. sections 103(a) as being unpatentable over Kriebel et al. in view of U.S. Patent 4,684,073 (Berggren). In response thereto, claim 12 has been amended. Accordingly, applicant submits that claim 4, which depends from

claim 1 discussed above, and claim 12 along with claims 13-20 depending therefrom are now in condition for allowance, which is hereby respectfully requested.

The analysis of the teaching of Kriebel et al., as applied to claim 1 above, is incorporated herein with respect to this rejection.

Berggren teaches a combined thickener and refiner that includes a screw press thickener 1 and a refiner 2. Screw press thickener 1 has a pulp inlet 3 and an outlet 4 for water pressed from the pulp. A screening jacket 5 is provided with drainage holes to remove water and thicken the material conveyed by screw 6. Refiner 2 includes a central inlet passage 7 to a central cavity 8 in which a propeller like means 9 is provided for degrading and distributing the incoming material. Material from cavity 8 moves outwardly through holes 10 into beating zone 12 between a rotor 11 and a stator 13. A screw 14 removes refined material.

In contrast to the teachings of Kriebel, et al. and Berggren, claim 1, as been amended, recites, in part:

> "... a rotor and stator assembly positioned within said housing radially outside of said distribution member, including a rotor and stator in opposed relationship defining a gap therebetween, said gap being between approximately 0.5 mm and 100 mm;"

In further contrast to the teachings of Kriebel et al. and Berggren, claim 12 recites:

> "... a rotor and stator assembly positioned within said housing radially outside of said distribution cross, including a rotor and stator in opposed relationship defining a gap therebetween, said gap being between approximately 0.5 mm and 100 mm;"

Applicant submits that such an invention is neither taught, disclosed nor suggested by

Kriebel, et al. nor Berggren, nor the combination thereof, and the present invention has distinct advantages over the prior art.

Kriebel et al. teaches a process and a device requiring a high shear. Close gaps between treatment plates are provided to cause mechanical interaction between fibers, thereby detaching and dispersing contaminants such as ink held thereon. Berggren also teaches a refiner in a combined apparatus including a screw press. Neither Kriebel et al. nor Berggren, alone or in combination teaches an apparatus for loading fibers with calcium carbonate with a rotor and stator assembly including a rotor and stator in opposed relationship defining a gap therebetween of between about 0.5 mm and 100 mm. The present invention teaches a low shear apparatus that does not create fiber to fiber mechanical interaction. Any such close interaction between fibers would change the crystallization process used in fiber filling in a negative way. To achieve optimal crystal growth the pulp fibers must stay fluffed. To retain this physical characteristic of the fibers, a wide gap, low shear apparatus is required, and one skilled in the art would not look to high shear apparatuses for use in fiber filling.

The present invention includes advantages over the prior art. The apparatus functions to improve productivity in a chemical loading process for fiber suspensions. The apparatus provides fiber loading in a continuous manner by improving output quantities of a loaded fiber suspension. The rotor and stator assembly adequately distributes the calcium carbonate crystals within the fiber suspension. For these reasons, it is respectfully submitted that independent claims 1 and 12 recite an invention not taught by Kriebel et al nor Berggren, nor the combination thereof, and that claim 4 which depends from independent claim 1 and claim 12 together with dependent claim 13-20 should be allowed.

Claim 1-21 have been rejected under 35 U.S.C. section 103(a) as being unpatentable over

Kriebel et al. as necessary with Berggren and further in view of U.S. Patent 5,223,090 (Klungness et al.). In response thereto, claims 1 and 12 have been amended. Accordingly, applicant submits that claims 1 and 12, along with claims 2-11 and 13-20 depending therefrom are now in condition for allowance, which is hereby respectfully requested.

The previous analyses herein of the teachings of Kriebel et al. and Berggren are incorporated also with respect to this rejection.

Klungness et al. teaches a fiber loading process using high shear mixing. Klungness et al. specifically teaches that a pressurized refiner can be used.

In contrast to the teachings of Kriebel et al., Berggren and Klungness et al., claim 1 as amended, recites in part:

> "... a rotor and stator assembly positioned within said housing radially outside of said distribution member, including a rotor and stator in opposed relationship defining a gap therebetween, said gap being between approximately 0.5 mm and 100 mm;"

In further contrast to the teachings of Kriebel et al., Berggren and Klungness et al., claim 12 as amended recites in part:

> "... a rotor and stator assembly positioned within said housing radially outside of said distribution cross, including a rotor and stator in opposed relationship defining a gap therebetween, said gap being between approximately 0.5 mm and 100 mm;"

Applicant submits that such an invention is neither taught, disclosed nor suggested by Kriebel, et al., Berggren nor Klungness, et al., nor any combination thereof, and the present invention has distinct advantages over the prior art.

Kriebel et al. teaches a process and a device requiring a high shear. Close gaps between treatment plates are provided to cause mechanical interaction between fibers, thereby detaching and dispersing contaminants such as ink held thereon. Berggren teaches a refiner in a combined apparatus including a screw press. Klungness, et al. teaches a high shear process using a refiner. Neither Kriebel et al., Berggren nor Klungness, et al., alone or in combination teaches an apparatus for loading fibers with calcium carbonate with a rotor and stator assembly including a rotor and stator in opposed relationship defining a gap therebetween of between about 0.5 mm and 100 mm. The present invention teaches a low shear apparatus that does not create fiber to fiber mechanical interaction. Any such close interaction between fibers would change the crystallization process used in fiber filling in a negative way. To achieve optimal crystal growth the pulp fibers must stay fluffed. To retain this physical characteristic of the fibers, a wide gap, low shear apparatus is required, and one skilled in the art would not look to the high shear apparatuses of the prior art for performing the fiber filling process.

The present invention includes advantages over the prior art. The apparatus functions to improve productivity in a chemical loading process for fiber suspensions. The apparatus provides fiber loading in a continuous manner by improving output quantities of a loaded fiber suspension. The rotor and stator assembly adequately distributes the calcium carbonate crystals within the fiber suspension. For these reasons, it is respectfully submitted that independent claim 1 recites an invention not taught by Kriebel et al. and that independent claim 1 together with dependent claim 2-10 should be allowed.

For the foregoing reasons, Applicant submits that the pending claims are definite and do particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Moreover, Applicant submits that no combination of the cited references teaches,

discloses or suggests the subject matter of the amended claims. The pending claims are therefore in condition for allowance, and Applicant respectfully requests withdrawal of all rejections and allowance of the claims.

In the event Applicant has overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, Applicant hereby conditionally petitions therefor and authorizes that any charges be made to Deposit Account No. 20-0095, TAYLOR & AUST, P.C.

Should any question concerning any of the foregoing arise, the Examiner is invited to telephone the undersigned at (260) 897-3400.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231, on: December 23, 2002.

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Name of Registered Representative

Signature

December 23, 2002
Date

Title: APPARATUS FOR LOADING FIBERS IN A FIBER SUSPENSION WITH CALCIUM CARBONATE
Application Serial No.: 09/902,975 Group: 1731 Examiner: Karen M. Hastings

ATTACHMENT A:
MARKED-UP COPY SHOWING AMENDMENTS

IN THE SPECIFICATION

The paragraph beginning on page 4, line 21 has been amended as follows, by deleting text in square brackets, and adding the text that is underlined:

Rotatable distribution member 14 is in the form of a distribution cross in the embodiment shown, having a plurality (namely four) radially extending paddles which distribute the pulp and lime mixture and/or pulp lime mixture received from inlet pipe 28 in a radially outward direction. Distribution cross 14 is concentrically coupled with input shaft 22, which in turn is rotatably driven via an electric motor 36 (Fig. 3). Distribution cross 14 having at least 2 to 8 paddles, preferably 4, and input shaft 22 thus each have a common axis of rotation 38. Distribution cross [15] 14 is also positioned generally concentric with inlet pipe 28 so as to evenly distribute the pulp and lime mixture in a radially outward direction within housing 12.

The paragraph beginning on page 5, line 15, has been amended as follows, by deleting text in square brackets, and adding the text that is underlined:

Rotor 40 and input shaft 22 are coupled together via disk [50] 49. Rotor 40 is coupled with disk [50] 49 such that rotor 40 is generally concentric about axis of rotation 38.

The paragraph beginning on page 7, line 18 has been amended as follows, by adding the text that is underlined:

The loaded fiber suspension then flows from gas ring 48 through rotor and stator assembly 16. More particularly, the fiber suspension flows through gap 44, as well as the spaces between adjacent teeth 46 of rotor 40 and stator 42. Rotor and stator assembly 16 distributes the calcium carbonate crystals in the fiber suspension. The fiber suspension has a pulp consistency of between approximately 0.1% and 50% when passing through rotor and stator assembly 16, and preferably has a pulp consistency of between approximately 2.5% and 35%. The fiber suspension, loaded with calcium carbonate crystals on and in the individual fibers within the fiber suspension, is discharged through accept outlet 30 to atmospheric pressure for further processing, such as to a machine or chest.

IN THE CLAIMS

Claims 1, 9, 12 and 19 have been amended as follows, by deleting text in square brackets, and adding the text that is underlined:

1. (Amended) An apparatus for loading fibers in a fiber suspension with calcium carbonate, comprising:

a housing having an inlet and an accept outlet;

a rotatable distribution member positioned within said housing;

a rotor and stator assembly positioned within said housing radially outside of said distribution member, including a rotor and stator in opposed relationship defining a gap therebetween, said gap being between approximately 0.5 mm and 100 mm;

a toothed ring interposed between said distribution member and said rotor and stator assembly, said toothed ring and said rotor and stator assembly defining a gas ring therebetween; and

a reactant gas supply fluidly coupled with said gas ring.

9. (Amended) The fiber loading apparatus of claim 8, including a control valve coupled with said reactant gas supply for controlling at least one of a pressure and flow rate of [carbon dioxide] a reactant gas into said gas ring.

12. Amended) An apparatus for loading fibers in a fiber suspension with calcium carbonate, comprising:

a housing having an inlet and an accept outlet;

a rotatable distribution cross within said housing, said distribution cross including [four] a plurality of radially extending paddles, said distribution cross having an axis of rotation;

a rotor and stator assembly positioned within said housing radially outside of said distribution cross, including a rotor and stator in opposed relationship defining a gap therebetween, said gap being between approximately 0.5 mm and 100 mm;

a toothed ring interposed between said distribution rotor and said rotor and stator assembly, said toothed ring having a plurality of teeth extending generally parallel to said axis of rotation and spaced apart from each other, said toothed ring and said rotor and stator assembly defining a gas ring therebetween; and

a reactant gas supply fluidly coupled with said gas ring.

19. (Amended) The fiber loading apparatus of claim 18, including a control valve coupled with said [carbon dioxide] reactant gas supply for controlling at least one of a pressure and flow rate of [carbon dioxide] reactant gas into said gas ring.